

REMARKS

The Office Action mailed April 5, 2002 has been reviewed and carefully considered. Claims 14 to 22, 25 to 28, and 31 to 34 have been amended. Claims 35 and 36 have been added. Claims 14 to 36 are pending in this application, with claims 14 and 27 being the only independent claims. Reconsideration of the above-identified application, as amended, and in view of the following remarks is respectfully requested.

In the Office Action mailed April 5, 2002, the Examiner requested an Abstract printed on a separate sheet. An Abstract is submitted herewith.

The specification has been amended to include a claim for priority.

Claims 14 to 34 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims have been amended to overcome this rejection. However, the indefiniteness rejections of claims 14 and 27 are not understood because it is believed that these claims as filed are perfectly clear American English and in conformance with current U.S. Patent Practice, and do not lack any antecedents. With respect to the rejection relating to "surfaces" (line 3), a web inherently has two surfaces. Therefore, there is no need to positively recite that the "web has two surfaces". The Manual of Patent Examining Procedure provides a similar example and states there is no antecedent basis problem:

"Inherent components of elements recited have antecedent basis in the recitation of the components themselves. For example, the limitation 'the outer surface of said sphere' would not require an antecedent recitation that the sphere has an outer surface." (M.P.E.P. §2173.05(e).

With respect to the limitations "the calendered surface" and "the coated surface", again, these elements are inherently recited in previous steps of the claims where it is recited that at least one surface of the web is calendered, and at least one calendered surface is coated. Nevertheless, to comply with the Examiner's requirements and to move this case forward, the claims have been amended to affirmatively recite that at least one calendered surface is formed upon calendering, and at least one coated surface is formed upon coating. Additionally in this vein, the word "material" has been deleted so that the claims refer only to a "base web", although it is believed this aspect of the claim was clear as originally filed.

Claims 14, 15, 18 to 22, 27, 28, 31 and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over PCT Patent Publication No. WO 96/28609 ("Eriksson") in view of U.S. Patent No. 5,582,689 ("Van Haag"). Dependent claims 16, 17, 23 to 26, 29, 30, 33 and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eriksson in view of Van Haag and further in view of U.S. Patent No. 5,483,873 ("Koivukunnas").

The invention relates to a method and apparatus for calendering paper or board. According to the invention, a web of paper or board is first calendered by a shoe calender, then coated and thereafter calendered with a short nip calender.

Eriksson discloses a method in which the web is treated after coating with a calender having an extended nip. Eriksson also includes a short reference that a pre-calendering step might be used in very special circumstances. The purpose of the method described in Eriksson is to improve the surface properties of the web without losing too much bulk or bending strength in calendering. This is evident from Eriksson's claims and specification. For example, on page 2, last line, to page 3 first line, it is stated that the calendering is done only after coating. On page 5, lines 12 to 16 of Eriksson (which was relied upon by the Examiner in the Office Action), it is stated that the web may be pre-calendered, but it will significantly decrease the benefits obtained by the method described. In Example 3 of Eriksson (pages 9 to 10), the claimed product is compared to a product that is calendered before coating, which clearly shows that, according to Eriksson, pre-calendering leads to inferior product.

Further, Eriksson only mentions that a pre-calendering step may be utilized and the calendering method may be of any type. Eriksson does not mention any example of these methods and even less their possible effects on the product. For these reasons, the teaching that Eriksson gives to a one skilled in the art is that using extended nip after coating provides benefits on the quality of the product, and pre-calendering should not be used since a lot of the bulk is lost in the pre-calendering process.

Van Haag discloses a shoe or an extended nip calender. Van Haag does not discuss the use of the calender in different environments and thus not include any information suggesting the use of this type of a calender either before coating or after coating. Van Haag also does not include any teach to contradict that of Eriksson. An uncoated web requires far superior forces for deformation than a coated web. The desired high deformation forces can be achieved by a shoe calender without causing high compressive forces and thus preventing high loss of bulk.

On the other hand short nip calender can be used on low liner load on coated layer since high deformation forces are not needed. This teaching is not included in cited references, especially in Eriksson. Therefore, there is no suggestion, teaching or motivation in either Eriksson or Van Haag to combine their respective teachings to obtain good printability and small loss of bulk in calendering.

For these reasons, independent claims 14 and 27 are patentable over Eriksson in view of Van Haag. Dependent claims 15 to 26 and 35 are patentable for the same reasons that independent claim 14 is patentable; dependent claims 28 to 34 and 36 are patentable for the same reasons that independent claim 27 is patentable.

New dependent claims 35 and 36 recite that the calender of the coated web has a nip length of "less than 30 mm." This aspect is not disclosed or suggested by Eriksson which uses an "extended nip" calender after coating which Eriksson defines as having a nip length of 3 to 10 cm. (Eriksson, page 3, lines 24 to 25). For this additional reason, dependent claims 35 and 36 are patentable.

Applicants respectfully submit that this application is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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AMENDMENTS TO THE CLAIMS SHOWING CHANGES

The following claims have been amended as follows:

14. A method for a calendering paper and board web when manufacturing coated grades of paper or board comprising:
- calendering at least one of the surfaces of an uncoated base [material] web with a shoe calender having a nip length of at least 50 mm to form at least one calendered surface;
- applying at least one layer of coating at least onto the at least one calendered surface of the base web to form at least one coated surface; and
- calendering the at least one coated surface of the base web with a calender having a nip length of no more than 50 mm.
15. The method of claim 14, wherein [the] an uncoated surface of the base web is calendered with a shoe calender having a nip length of 50 to 270 mm.
16. The method of claim 14, wherein the at least one coated surface of the base web is calendered with a belt calender having a nip formed between two rolls.
17. The method of claim 14, wherein the at least one coated surface of the base web is calendered with a belt calender having a nip formed by means of a short shoe.
18. The method of claim 14, wherein the uncoated surface of the base web is calendered with a shoe calender having a shoe divided into sectors in a travel direction of the base web, a compression load of the sectors being independently controllable.
19. The method of claim 16, wherein [the] an uncoated surface of the base web is calendered with a shoe calender having a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.

20. The method of claim 17, wherein [the] an uncoated surface of the base web is calendered with a shoe calender having a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.
21. The method of claim 15, wherein pressure applied to the uncoated surface of the base web by the shoe calender [in] is from 0 to 15 MPa.
22. The method of claim 15, wherein pressure applied to the uncoated surface of the base web by the shoe calender [in] is from 4 to 12 MPa.
25. The method of claim 23, wherein the base web is heated with the aid of one of the group consisting of pre-wetting, pre-steaming and heating the web with a heated backing roll.
26. The method of claim 24, wherein the base web is heated with the aid of one of the group consisting of pre-wetting, pre-steaming and heating the web with a heated backing roll.
27. An apparatus for calendering a paper and board web when manufacturing coated grades of paper or board comprising:
a first calender for calendering at least one of the surfaces of an uncoated base [material] web to form at least one calendered surface, the first calender comprising a shoe calender having a nip length of at least 50 mm;
a means for applying at least one layer of coating at least onto the at least one calendered surface of the base web to form at least one coated surface; and
a second calender for calendering at least the at least one coated surface of the base web, the second calender having a nip length of no more than 50 mm.
28. The apparatus of claim 27, wherein the shoe calender [having] has a nip length of 50 to 270 mm.
31. The apparatus of claim 27, wherein the shoe calender has a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.

32. The apparatus of claim 28, wherein the shoe calender has a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.

33. The apparatus of claim 29, wherein the shoe calender has a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.

34. The apparatus of claim 30, wherein the shoe calender has a shoe divided into sectors in a travel direction of the web, a compression load of the sectors being independently controllable.